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(54) Safety latch mechanism for a ceiling access panel

(57) A safety latch mechanism controls the early stage of opening movement of a ceiling access panel that is pivotally mounted in a frame. A spring-biased laterally movable detent pin (2) is mounted on the access panel or on the frame, and traverses a track (11,12,13,14,15) in a guide and holding member (10) on the other of the access panel and frame as the panel is moved to and from its fully closed position. The guide

and holding member has an open mouth portion (11) and a cyclic track for the detent pin (2), including a holding cup (14) for receiving the weight of the access panel and holding it in a partially open position. The access panel can be released from that partially open position by lifting it slightly, when the detent pin (2) moves under its spring bias through a track portion (15) which returns it to the open mouth (11).

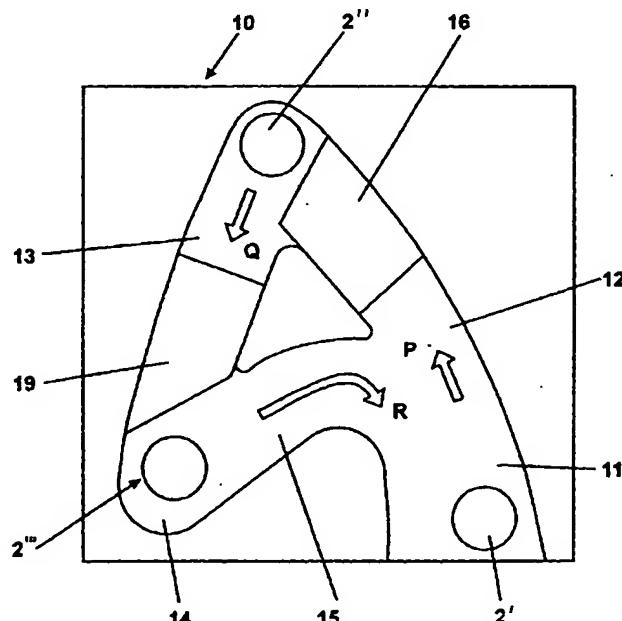


FIG.4

Description

[0001] The invention relates to ceiling access panels and provides a safety latch mechanism for such access panels. Such a safety latch mechanism permits the safe controlled opening of a ceiling access panel.

Background Art

[0002] Access panels for suspended false ceilings can be very heavy. A typical construction for such an access panel could be a steel panel hinged to a frame which is incorporated into the metal grid which supports the suspended ceiling, and one or more ceiling tiles carried on the underside of the steel panel. The steel panel generally has a down-turned rim and the ceiling tiles slot into a channel formed by an inturned flange of that rim. The entire structure may weigh some tens of kilograms, which means that opening the access panel can be quite hazardous. Once released, the access panel can swing violently downwards, risking injury to the person attempting to gain access to the void space above the suspended ceiling.

[0003] Generally speaking, ceiling access panels have a bolt or budget lock for restraining them in their fully closed condition. The user has to use one hand to unlock the panel for example by inserting a key and turning the budget lock. Preferably the panel is then held by a safety mechanism in a partially open condition and prevented from falling open in an uncontrolled fashion. This enables the user to re-position himself before taking the entire weight of the panel. GB-B-2213507 discloses one method of controlling the descent of the panel, using a tape brake mechanism. That brake mechanism is however mounted close to the hinged edge of the access panel and so it exerts a very substantial torque on the ceiling grid from which the panel is suspended. Also it is not easy for anyone unfamiliar with the brake mechanism to work out without instruction how to lower the panel by a series of lift and release movements.

[0004] There is therefore a need for a simple and robust mechanism for preventing accidental loss of control of the panel during opening. The present invention satisfies that need.

The Invention

[0005] The invention provides a safety latch mechanism for a ceiling access panel pivotally mounted in a frame, comprising:

a spring-biased laterally movable detent pin for mounting on one of the ceiling access panel and frame and

a guide and holding member for mounting on the other of the ceiling access panel and frame, for receiving an end portion of the detent pin as the ac-

cess panel is opened and closed, wherein the guide and holding member comprises

an open mouth portion for accepting the end portion of the detent pin as the panel is moved towards its closed condition, a first track portion communicating with the open mouth portion, for guiding the detent pin and moving it laterally against the spring bias as the access panel is moved to its fully closed condition; a non-return barrier at the end of the first track portion for preventing return of the detent pin down the first track portion; a second track portion for receiving the end portion of the detent pin and guiding it into a holding cup for supporting the weight of the ceiling access panel in a partially open condition of the panel; and a third track portion for receiving the end portion of the detent pin and guiding it from the holding cup to the open mouth portion when the ceiling access panel is lifted slightly from its partially open condition.

[0006] In use, the detent pin is mounted on one of the access panel and frame and the guide and holding member is mounted on the other. Preferably a pair of oppositely handed latch mechanisms is provided, located one on each edge of the access panel and frame at locations remote from the hinge, near to the leading opening edge of the access panel. When the access panel is in its fully closed and locked condition, the or each detent pin is at the junction of the first and second track portions. When the access panel is to be opened, a user would typically use one hand to support the panel while using the other hand to unlock it. The weight of the panel would suddenly be released but if the panel were to open rapidly and out of control, that descent would be only for a few centimetres, equivalent to the length of the second track portion. The panel would then be arrested by the or each detent pin being located in its associated holding cup at the end of the second track portion. That temporary arrest gives the user time to re-position himself if necessary, take the full weight of the panel with both hands, and lift the panel slightly until the or each detent pin traverses the associated third track portion and exits the guide and holding member via the open mouth portion

[0007] The non-return barrier ensures that the detent pin progresses from the first to the second track portion and does not return down the first track portion on release of the panel from its closed and locked condition. The barrier may be a resiliently displaceable barrier which is cammed out of the path of the pin as the pin proceeds upwardly through the first track portion, but which springs back behind the pin to prevent return movement of the pin when the pin clears the first track

portion and barrier. Alternatively the barrier may be a fixed ramp and the pin itself may be axially movable to ride up the ramp and spring back down on the other side when the pin clears the ramp.

[0008] A similar non-return barrier may if desired be provided at the end of the second track portion, to prevent return of the detent pin from the holding cup, back along the second track portion. The second non-return barrier is, however, an optional feature since the lateral spring bias on the detent pin does in itself tend to deter the detent pin from re-entering the second track portion.

[0009] The safety latch mechanism of the invention is particularly suitable for use with a ceiling access panel as described and claimed in our copending Patent Application No. EP filed herewith and entitled "Access panel assembly for a false ceiling or firewall".

DRAWINGS

[0010]

Figure 1 is a perspective view of a block housing the detent pin of a mechanism according to the invention;

Figure 2 is a perspective view of the block of Figure 1 from the other side, and with a base plate removed;

Figure 3 is a perspective view of a guide and holding member of a mechanism according to the invention; Figure 4 is a side elevation of the guide and holding member of Figure 3, illustrating the path of movement of the detent pin;

Figure 5 is a side elevation similar to that of Figure 4, but showing the pin moving towards the end of the first track portion;

Figure 6 is a side elevation corresponding to Figures 4 and 5 but showing the pin at the end of the first track portion;

Figure 7 is a section taken along the line A-A of Figure 5;

Figure 8 is a section taken along the line B-B of Figure 6; and

Figure 9 is a section taken along the line C-C of Figure 6.

[0011] The safety latch mechanism illustrated comprises a spring-biased laterally movable detent pin housed in a mounting block for mounting on one edge portion of a ceiling access panel or a frame in which the ceiling access panel is pivotally mounted; and a guide and holding member as illustrated in Figures 3 to 9 for mounting on the other of the ceiling access panel and mounting frame, in relative positions such that the detent pin is received in the track of the guide and holding member as the access panel is opened and closed.

[0012] Referring first to Figures 1 and 2, there is shown a mounting block 1 in which a detent pin is laterally movable in the direction of the double-headed arrow

X-Y. The detent pin extends through a slot 3 in the mounting block 1, and is mounted on or formed integrally with a slide plate 4 which is guided internally of the block 1 for movement in a straight line only. A torsion spring 5 biases the detent pin in the direction of the arrow-head X as shown in Figure 2, but it can be moved against the bias of that spring in the direction Y. The block 1 can be firmly secured to the ceiling access panel or frame by means of bolts (not shown) passing through mounting apertures 6.

[0013] Figures 3 to 9 illustrate the guide and holding member which defines a cyclic track for receiving and guiding the end of the detent pin 2 as the access panel is opened and closed. The guide and holding member comprises a block 10 into which is formed a channel comprising an open mouth portion 11, a first track portion 12, a second track portion 13, a holding cup 14 and a third track portion 15.

[0014] Figure 4 shows three successive positions of the detent pin 2, namely a position 2' entering the open mouth 11 of the track; a position 2" at the uppermost portion of the track between the first track portion 12 and the second track portion 13; and a position 2''' when resting in the holding cup 14. Also in Figure 4 there is shown a first arrow P depicting the movement of the detent pin through the first track portion 12; an arrow Q depicting the motion of the detent pin 2 through the second track portion 13; and an arrow R depicting the motion of the detent pin 2 through the third track portion 15. It will be appreciated that Figures 4 to 9 are schematic only in the sense that the detent pin 2 would in practice contact the wall of the track, although for illustrative purposes only the drawings show a spacing between the pin and the track wall.

[0015] A non-return barrier 16 is provided in the first track portion 12, and comprises a spring-loaded depressable ramp 17 leading to a detent shoulder 18. As the detent pin 2 passes up the first track portion 12 in the direction of the arrow P, it depresses the ramp portion 17 of the non-return barrier 16 as illustrated in Figures 5 and 7, so that it can pass to the position 2'' shown in Figures 4, 6 and 8, when the non-return barrier 16 springs up behind the detent pin and forms, through its shoulder 18, a barrier for preventing return movement of the detent pin 2 back down the first track portion 12 in a direction opposite to that of the arrow P.

[0016] An entirely analogous second non-return barrier 19 is provided in the second track portion 13, as illustrated in Figures 6 and 9, for preventing return movement of the detent pin from the position 2''' back up the second track portion 13 in a direction opposite to that of the arrow Q.

[0017] In use, suppose that the block 1 is secured fast to an edge portion of a ceiling access panel, near to the leading opening edge which is the edge remote from the hinge. The guide and holding member 10 would then be secured (by means not illustrated) to the corresponding edge of the frame, so that when the ceiling access panel

is closed the detent pin 2 enters the open mouth 11 of the guide and holding member 10. As the ceiling access panel is raised to its fully closed position, the detent pin 2 contacts the upper surface of the first track portion 12 and is cammed laterally in its slot 3 in the direction of the arrow-head Y of Figures 1 and 2. When it reaches the top-most position 2" the ceiling access panel is fully closed, and the user can lock the access panel in that closed position by means of a bolt or budget lock (not shown).

[0018] To open the ceiling access panel, the user would typically support the weight of the ceiling access panel with one hand while using the other hand to unbolt or unlock the panel. That would leave the user trying to support the weight of the access panel and control its opening movement with one hand, which might be difficult or impossible bearing in mind that the access panel is likely to be extremely heavy, and the user could be standing on an elevated platform or a ladder to be able to reach the ceiling access panel.

[0019] The safety latch mechanism of the invention permits the ceiling access panel to fall heavily under its own weight without swinging fully open. On release of the securing bolt, the access panel starts to open but the detent pin 2 simply passes down the second track portion Q to the position 2", when it is received in the holding cup 14. The user can then re-position himself, obtain a better grip on the access panel if necessary, and using both hands lift the access panel slightly until the detent pin 2 under the bias of the torsion spring 5 traverses the third track portion 15 in the direction of the arrow R and exits the open mouth 11 of the guide and holding member 10.

[0020] During closing of the panel it is possible that the user would be using both hands in order to lift the panel to its fully closed position. In those circumstances the user would not have one hand free with which to lock the panel, but using a safety latch mechanism according to the invention the panel could be released without locking it, and the detent pin 2 would simply pass to the position 2" in which it was supported by the holding cup 14. The user could then re-position himself or herself, take the weight of the panel with one hand only, and raise the panel fully so that the pin 2 traverses the third track portion 15 but then instead of passing out through the open mouth 11 continues upwardly through the first track portion in the direction of the arrow P to the position 2" in which it is held until the panel is locked. It will be appreciated that the pin 2 can travel cyclically around the generally triangular path of the arrows P, Q and R for as many times as is necessary prior to the actual locking of the panel in its fully closed position using a bolt or budget lock (not shown).

[0021] It will be appreciated that the second non-return barrier 19 may if desired be omitted, because the torsion spring 5 acting on the detent pin 2 does in fact impart a lateral bias on the pin, urging it to move from the position 2" in the direction of the arrow R in prefer-

ence to passing in the wrong direction up the second track portion 13. The second non-return barrier 19 can, however, be provided at relatively little additional expense by forming the first and second barriers 16 and 19 from the same piece of bent spring steel. Alternatively it will be appreciated how the non-return barriers 17 and 19 could be fixed ramps in association with a detent pin 2 that is axially movable as well as being laterally movable. The pin 2 would then ride up each in turn of the two fixed ramps 17 and 19, passing a point of no return when it clears the top-most shoulder of each respective ramp.

15 Claims

1. A safety latch mechanism for a ceiling access panel pivotally mounted in a frame, comprising:

20 a spring-biased laterally movable detent pin (2) for mounting on one of the ceiling access panel and frame and

25 a guide and holding member (10) for mounting on the other of the ceiling access panel and frame, for receiving an end portion of the detent pin (2) as the access panel is opened and closed,

wherein the guide and holding member (10) comprises

30 an open mouth portion (11) for accepting the end portion of the detent pin (2) as the panel is moved towards its closed condition,

35 a first track portion (12) communicating with the open mouth portion (11), for guiding the detent pin (2) and moving it laterally against the spring bias as the access panel is moved to its fully closed condition;

40 a non-return barrier (16) at the end of the first track portion (12) for preventing return of the detent pin (2) down the first track portion (12);

45 a second track portion (13) for receiving the end portion of the detent pin (2) and guiding it into a holding cup (14) for supporting the weight of the ceiling access panel in a partially open condition of the panel; and

50 a third track portion (15) for receiving the end portion of the detent pin (2) and guiding it from the holding cup (14) to the open mouth portion (11) when the ceiling access panel is lifted slightly from its partially open condition.

55 2. A mechanism according to claim 1, wherein the first non-return barrier (16) is a resiliently displaceable barrier that is cammed out of the path of the detent

pin (2) as the detent pin (2) moves forwardly along the first track portion (12) but which moves to block the return movement of the detent pin (2) as the detent pin (2) exits the first track portion (12). 5

3. A mechanism according to claim 1, wherein the detent pin (2) is axially movable and the first non-return barrier (16) is a ramp which cams the detent pin (2) axially as the pin (2) traverses the first track portion (12), the pin (2) engaging beyond the ramp to prevent reverse movement of the pin (2) back down the first track portion (12) when the pin (2) clears the ramp. 10

4. A mechanism according to any preceding claim, wherein a second non-return barrier (19) is provided at the end of the second track portion (13), for preventing return of the detent pin (2) from the holding cup (14), back along the second track portion (13). 15

5. A mechanism according to claim 4, wherein the second non-return barrier (14) is a resiliently displaceable barrier that is cammed out of the path of the detent pin (2) as the detent pin (2) moves downwardly along the second track portion (13) but moves to block the return movement of the detent pin (2) as the detent pin (2) reaches the holding cup (14). 20

6. A mechanism according to claim 4, wherein the detent pin (2) is axially movable and the second non-return barrier (19) is a ramp which cams the detent pin (2) axially as the pin (2) traverses the second track portion (13), the pin (2) engaging beyond the end of the ramp to prevent reverse movement of the pin (2) back up the second track portion (13) when the pin (2) clears the ramp. 25

7. A mechanism according to any preceding claim, wherein the detent pin (2) is carried by a housing (1) for mounting on the ceiling access panel, the housing (1) comprising a linear slot (3) through which the detent pin (2) protrudes to present its end portion to the guide and holding member (10), and a leaf spring (5) is also carried by the housing (10) to exert the spring bias on the detent pin (2), urging the detent pin (2) to move laterally to one end of the slot (3). 30

8. A ceiling access panel assembly comprising an access panel pivotally mounted in a frame, the entire assembly being mountable as part of a suspended ceiling so that a pivotal lowering of the access panel provides access to a void space above the suspended ceiling, characterized in that on one or both side edges of the access panel and frame at positions remote from the pivotal axis is a safety latch 35

mechanism comprising a spring-biased laterally movable detent pin (2) on one of the frame and panel, and a guide and holding member (10) on the other of the frame and panel, the guide and holding member (10) comprising an open mouth portion (11) for accepting the end portion of the detent pin (2) as the panel is moved towards its closed condition, a first track portion (12) communicating with the open mouth portion (11), for guiding the detent pin (2) and moving it laterally against the spring bias as the access panel is moved to its fully closed condition; a non-return barrier (16) at the end of the first track portion (12) for preventing return of the detent pin (2) down the first track portion (12); a second track portion (13) for receiving the end portion of the detent pin (2) and guiding it into a holding cup (14) for supporting the weight of the ceiling access panel in a partially open condition of the panel; and a third track portion (15) for receiving the end portion of the detent pin (2) and guiding it from the holding cup (14) to the open mouth portion (11) when the ceiling access panel is lifted slightly from its partially open condition. 40

9. A ceiling access panel according to claim 8, wherein the detent pin (2) is provided on the access panel and the guide and holding member (10) is provided on the frame. 45

10. A ceiling access panel according to claim 8 or claim 9, wherein an identical but oppositely handed safety latch mechanism is provided on each of the two opposite side edges of the access panel and frame. 50

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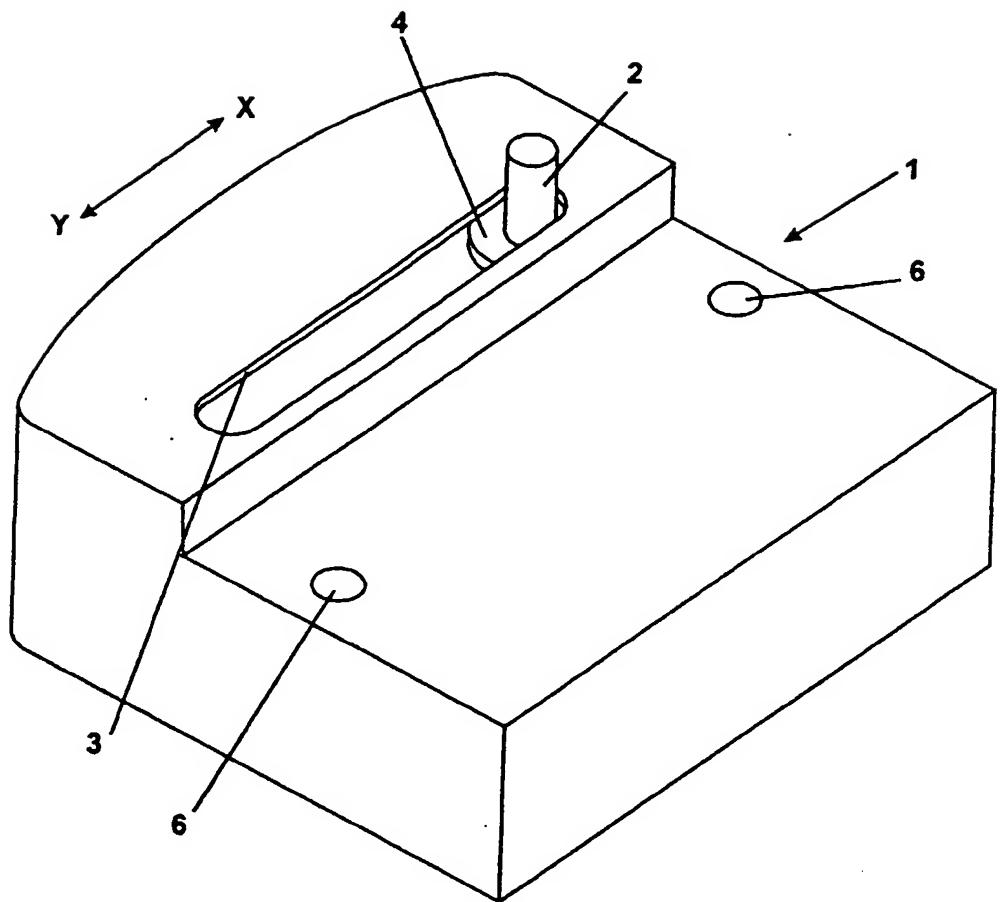


FIG.1

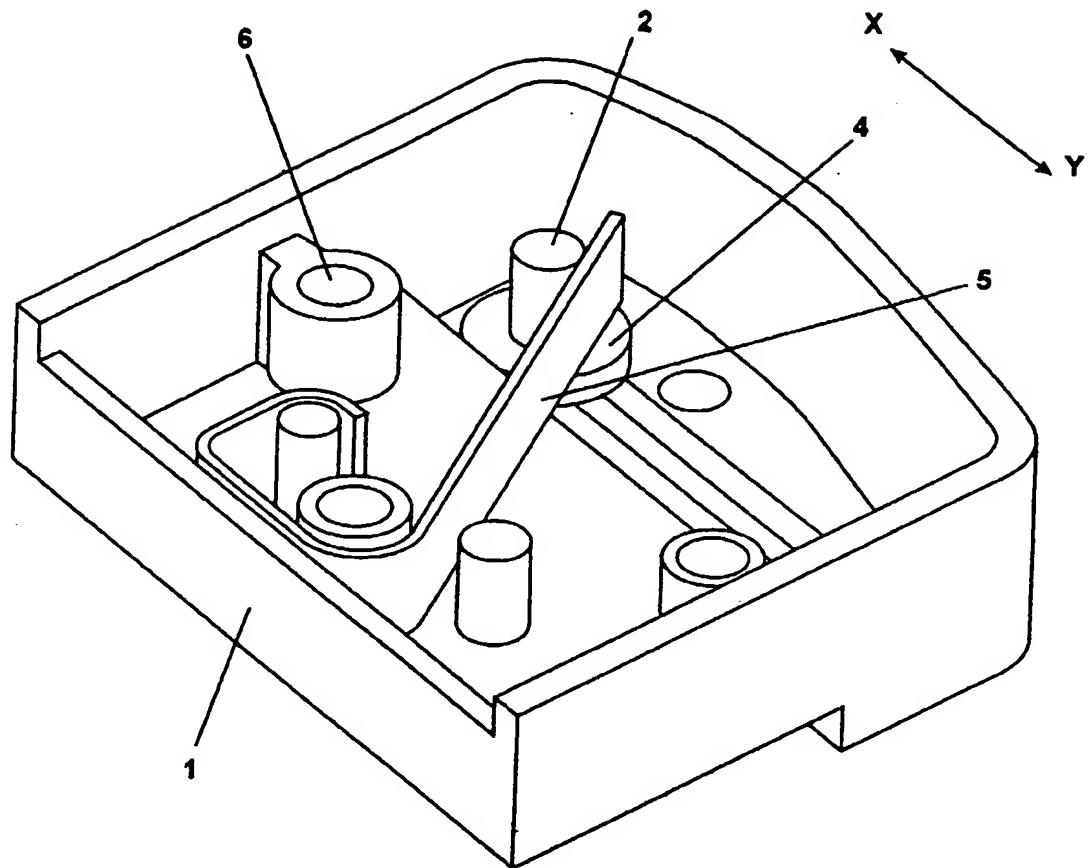


FIG.2

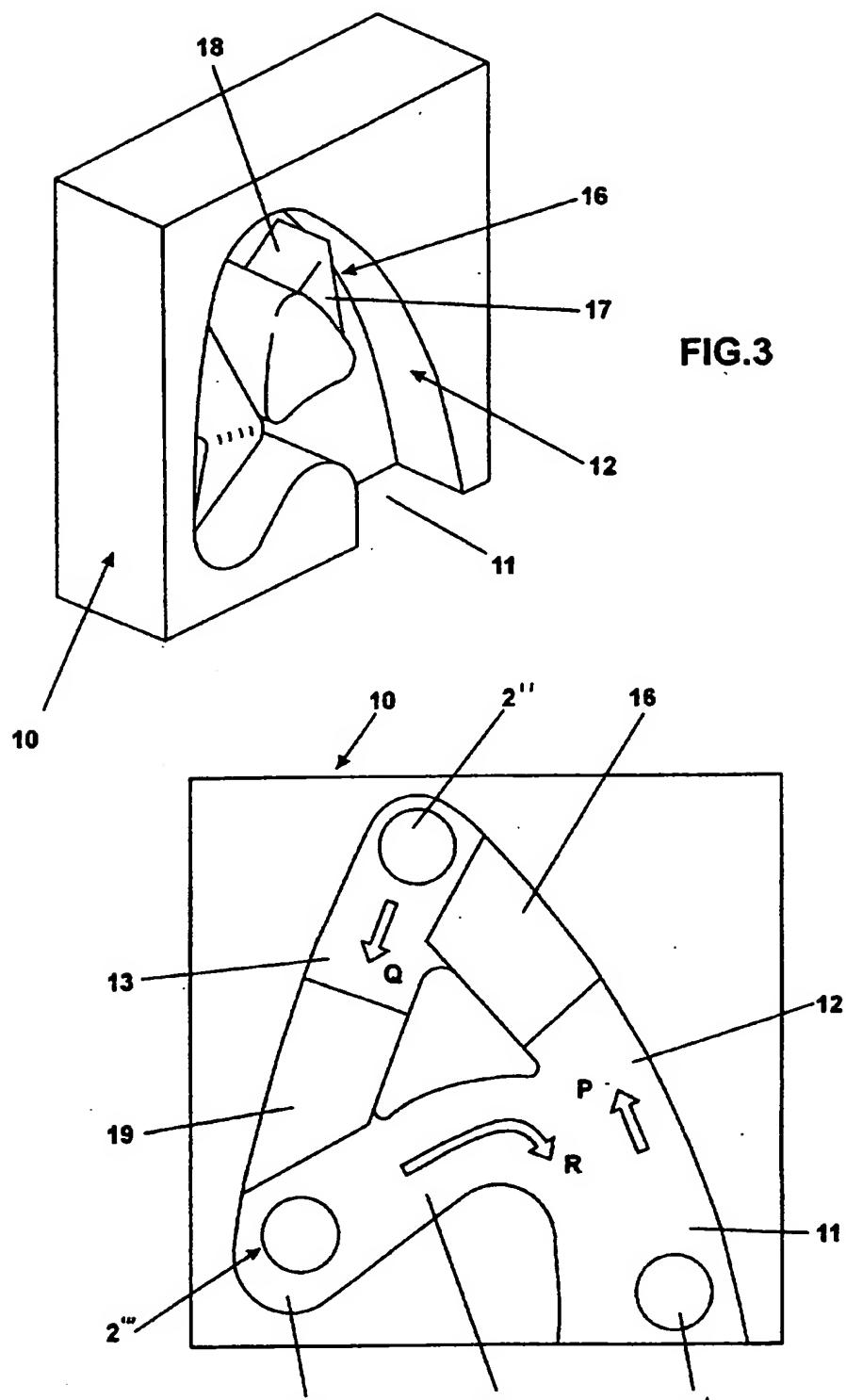
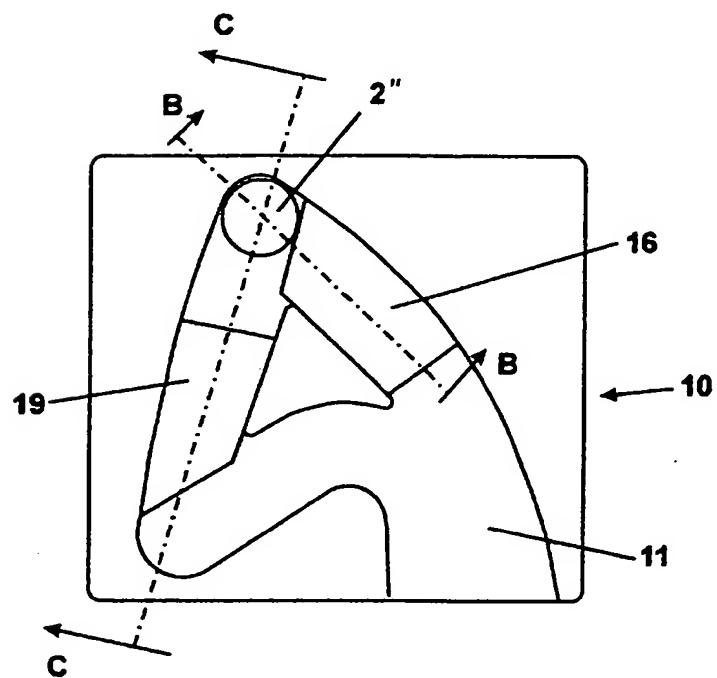
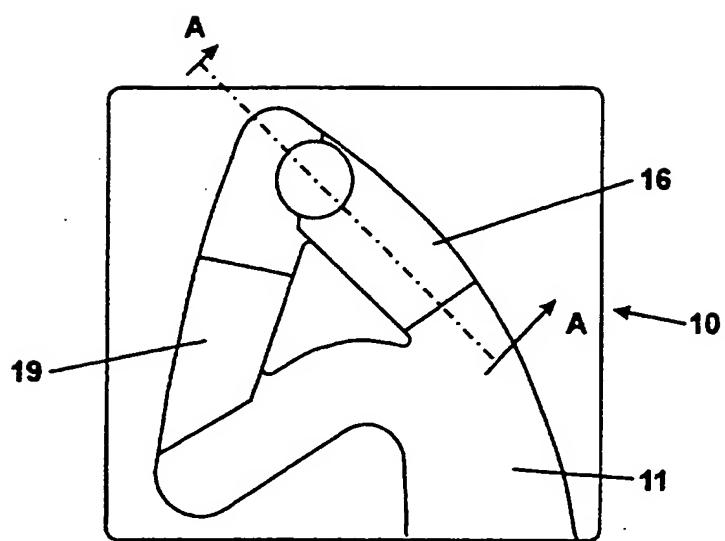


FIG.4



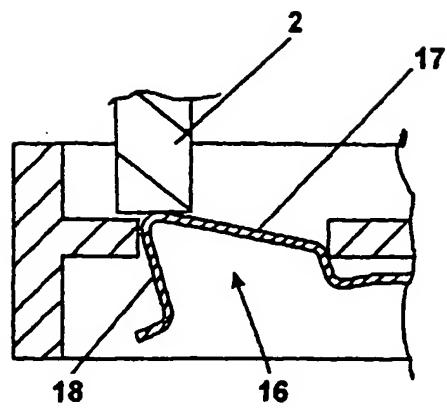


FIG.7

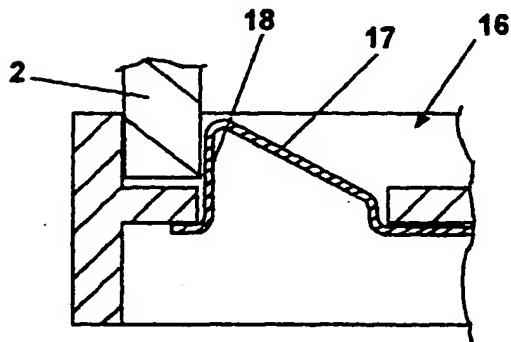


FIG.8

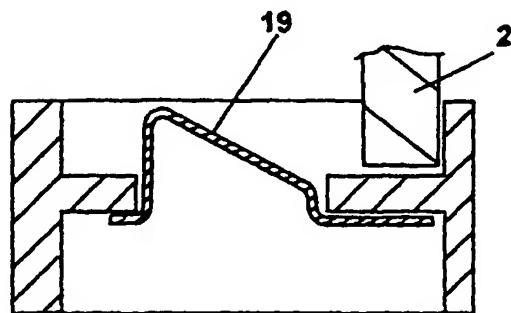


FIG.9



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EUROPEAN SEARCH REPORT

Application Number

EP 99 30 5564

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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<p>The present search report has been drawn up for all claims</p>			
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THE HAGUE	6 December 1999	Westin, K	
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